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Sad but true? - How induced emotional states differentially bias self-rated Big Five personality traits

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Abstract

Background: The Big Five are seen as stable personality traits. This study hypothesized that their measurement via self-ratings is differentially biased by participants' emotions. The relationship between habitual emotions and personality should be mirrored in a patterned influence of emotional states upon personality scores.

Methods: We experimentally induced emotional states and compared baseline Big Five scores of ninety-eight German participants (67 female; mean age 22.2) to their scores after the induction of happiness or sadness. Manipulation checks included the induced emotion's intensity and durability.

Results: The expected differential effect could be detected for neuroticism and extraversion and as a trend for agreeableness. Post-hoc analyses showed that only sadness led to increased neuroticism and decreased extraversion scores. Oppositely, happiness did not decrease neuroticism, but there was a trend for an elevation on extraversion scores.

Conclusion: Results suggest a specific effect of sadness on self-reported personality traits, particularly on neuroticism. Sadness may trigger different self-concepts in susceptible people, biasing perceived personality. This bias could be minimised by tracking participants' emotional states prior to personality measurement.

Keywords: Personality, Assessment, Emotion, Happiness, Sadness

Background

How are you? We regularly enquire about well-being and intuitively assume that emotional states may guide our thoughts and behaviour, moderating our personality. Although there are many different definitions of personality, it is widely accepted that personality traits are "habitual patterns of behaviour, thought, and emotion" (Kassin 2003, p. 327). As we can see a lot of similarity between emotional states and personality traits – both influence the probability of exhibiting certain behaviours – it seems to be important to examine this relationship in more detail. This study investigates the effect of participants' emotional states on personality testing.

Today's most popular framework of personality traits are the Big Five (Costa and McCrae 1985). The Big Five consist of five personality dimensions: neuroticism, extraversion, openness for experience, agreeableness and conscientiousness. Personality shows a moderate degree of stability over time (Hampson and Goldberg 2006; Lucas and Donnellan 2011) and even has a genetic basis (Tellegen et al. 1988) whilst still changing dynamically in relation to life events conceptually similarly and to the same magnitude as income (Boyce et al. 2013). Though, research shows that Big Five's retest reliability is not perfect: A meta-analysis of 848 stability coefficients from different manuals measuring one or more of the Big Five dimensions reports average coefficients varying between .69 and .76 (Viswesvaran and Ones 2000). These results indicate that the remaining 42-52% variance derives from other influencing factors. Some external factors have already been identified: Namely, the source of information, for example self ratings versus ratings by external observers (Allik et al. 2010), and the interview process, for example a comparison of face-to-face interviews, telephone interviews and self-rated

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questionnaires (Lang et al. 2011). But questions about the instability of personality traits within-subject remain. In Viswesvaran and One's own words (2000, p. 227): "The stability of personality traits … [has] been a major source of consternation for personality psychology."

The conceptualization of personality suggests that its testing should not be influenced by temporary moods: People should respond to how they think and behave in general rather than how they feel in the current situation. However, being a systematic but fluctuating source of measurement variance, it is possible that emotional states bias response as other personal states (e.g., the activation of a certain social role) do (Donahue and Harary 1998). Emotional states should also be considered as a source of such "patterned" measurement bias, as evidence derived from related areas of study would suggest.

The influence of mood on self-attributes and self-conception has been studied (Sedikides 1995). In a series of between-subject experiments, happy, neutral or negative mood was induced and a significant influence of mood on self-rated negative and positive behaviours was found for behaviours which subjects previously rated as rather unself-descriptive (Sedikides 1995).

Recent affect-cognition theories suggest relationships between cognition and affect (Forgas 2008). The affect infusion model (AIM, Forgas 1995) states that affective influence may occur through inferential and memory based mechanisms depending on the processing style used in a respective situation (Forgas 2008). Further, affect may influence the information processing strategy. In doing so, negative affect can even reduce judgement errors (Forgas 1998, 2008). For example, participants in a negative mood were more accurate in responding to their partner's self-disclosure (Forgas 2011). Therefore, altered information processing (Forgas 2008) caused by emotions may result in an altered self-description. As personality assessment relies overly on self-descriptions, we deduce an effect of emotional states on personality testing.

Relationships between personality and habitual emotions

Research on habitual emotions acknowledges that individuals typically differ in how they experience emotions and that the frequency of emotions varies among people. In short, habitual emotions dispose of a trait quality, which makes them appropriate for integration in personality models (Watson and Clark 1992). Empirically, relationships of discrete habitual emotions or the superior factors of negative and positive affect with the Big Five dimensions have been reported. Neuroticism correlates positively with anxiety and negative affect (Becker 2001; Clark and Watson 1999; Watson and Clark 1992). Extraversion correlates positively with happiness and shows a moderately positive correlation with positive affect (Becker 2001; Clark and Watson 1999; Watson and Clark 1992). Finally, agreeableness correlates negatively with annoyance/anger (Becker 2001). Therefore, at least three of the Big Five traits are associated with habitual emotional experiences, neuroticism and extraversion in particular (Becker 2001). Considering that frequent and intense experience of negative affect is associated with higher neuroticism, measuring neuroticism during negative affect may increase scores.

Habitual emotions systematically predict how often and intensely an individual experiences emotions. Those personality traits that are strongly associated with habitual emotions are able to predict emotional experiences as well. This emotional reactivity has been demonstrated by various studies (e.g., Hemenover 2003; Smillie et al. 2012).

Goals and hypotheses

We therefore conclude that the underlying pattern of the relationship between habitual emotion and personality traits should be mirrored in similarly patterned relations between emotional states and the measurement of personality traits. The purpose of this study is to show that 1) emotional states do have a systematic influence on personality measurement (not necessarily on personality itself), that 2) this influence also varies according to the construct-related similarity between the emotion and personality dimensions and according to 3) the valence of the emotion.

Hypothesis 1: Emotional states generally and differentially alter self-rated personality dimensions compared to base-line measurements.
Hypothesis 2: This differential effect occurs mainly for neuroticism, extraversion and agreeableness.
Hypothesis 3: According to the reported relationships between habitual emotion and personality factors, sadness as a negative emotion explains the differential effects on neuroticism and agreeableness, while the positive emotion happiness explains the effect on extraversion.

Regarding research on emotional reactivity, neuroticism and extraversion at baseline should also predict how intense and how long the respectively related emotion was experienced. In sum, we hypothesize that emotional states directly bias personality reporting.

Methods

Participants

From 107 participants, nine (8.4%) were excluded because of missing values. The remaining 98 participants were, on average, 22.2 years old ($SD = 4.74$; $min = 14$; $max = 49$), 70% were psychology students and the majority were female (67%). Participants gave written informed consent for participation. This study was

exempt from ethical approval by the Review Board of the University of Bielefeld.

Treatment and measurement

All participants attended the experiment twice with a time lag of about one month ($M = 33.7$ days, $SD = 4.58$, $min = 27$; $max = 44$). Treatment was in accordance with APA ethical standards. At the beginning of the first session, each participant provided informed consent prior to the experiment. Importantly, before responding to the NEO-FFI at each measurement, participants were asked to describe their personality *in general* and as accurately as possible. Subsequently, all further instructions were given via computer to avoid instructor effects.

Treatment in the emotional condition

At the beginning of this condition the emotion was induced via a ten minute short film. To provide strong emotions with an unequivocal valence, we chose happiness as the positive and sadness as the negative emotion. Subsequently to the film, participants were asked to imagine happy or sad scenes from their own personal experience. Music was played in accordance with the emotion. Additionally, participants were asked to focus upon their physical reactions to the induced emotion, and increase them if possible. Participants then had three minutes to adopt the emotion. In this way we used visual, auditory, proprioceptive and cognitive means to induce the emotion.

As stimuli we chose an excerpt from the film 'Philadelphia' and Barber's 'Adagio pour cordes' to stimulate the sad condition. A short report about the fall of the Berlin Wall including a reunion of a long divided family and Mozart's 'Eine kleine Nachtmusik' was used for the happy condition. The same pieces of music were successfully used to induce emotions by Eich and Metcalfe (1989).

On the last slide of the power-point-presentation, participants were informed that the emotional induction was over and they were given the pen-and-paper part of the experiment. Before filling out the personality questionnaire, participants were asked to answer all items as honestly as possible to avoid biases caused by social desirability. At first, they responded to the item "Right now I feel very happy/sad", ranging from 0 (strong disagree) to 6 (strong agree) as a manipulation check. This was repeated in the last item of the questionnaire to indicate the induced emotion's durability. The emotion control items derived from the manipulation check were used as dependent variables for the correlative replication of emotional reactivity. The session ended with a debriefing; participants were asked how they felt and, especially in the sadness-group, we offered the possibility to talk about what they felt during the experiment.

Treatment in the neutral condition

The neutral (or baseline) condition contained a short film of ten minutes before participants filled out the questionnaire (without the emotion-control items). We decided to show a film about savants, humans with extraordinary skills, with the intention not to evoke any emotion. After the short film, the participants were asked to briefly give thought to their own strengths and weaknesses to encourage them to be more self-alert.

Measurement

The dependent variables were the Big Five personality scores measured with a German version of the NEO-FFI (Five factor inventory, Borkenau and Ostendorf 1993; Costa and McCrae 1992). This questionnaire consists of 60 items, which are summed up as the Big Five personality factors: Neuroticism, extraversion, openness to experience, agreeableness and conscientiousness (each 12 items). As the original NEO-FFI only uses a five-point Likert-scale, we increased measurement sensitivity by using a seven-point Likert-scale. As this approach was experimental, we computed the intercorrelations for the five factors of our sample to check for deviations from the model. As expected, the results matched those of the NEO-FFI manual: only the same three intercorrelated. However, our version revealed even higher intercorrelations (correlation between neuroticism and extraversion -.33 vs. -.38 in our sample; agreeableness and extraversion .16 vs. .31; conscientiousness and neuroticism -.31 vs. -.41).

Experimental design

Every participant was measured twice. Once in a neutral condition that served as a baseline measurement and about one month earlier or later in the emotional condition. We altered 1) the order of the conditions to avoid sequence effects, and 2) the sequence of the items (original sequence vs. opposite sequence, beginning with the original sequence's last item), to avoid habituation effects. In sum, the participants were randomly assigned to 8 subgroups, each a combination of the following three dichotomous possibilities (see Table 1):

- Induced emotion: A) happiness or B) sadness
- Order of treatment condition: C) firstly emotional and secondly neutral, D) vice versa
- Sequence of items: E) original sequence of the questionnaire in the emotional condition and opposite sequence in the neutral condition, F) vice versa

Statistical analysis

For the manipulation check of the induced emotions we performed ordinal Wilcoxon signed-rank tests to compare induction success. To examine shifts in reported

Table 1 Participants' distribution for combinations of treatment condition, order and sequence of items

Induced emotion	A) happiness				B) sadness			
n	45				53			
Order of condition C[1] or D[2]	AC)		AD)		BC)		BD)	
n (xC: n = 49; xD: n = 49)	*22*		*23*		*27*		*26*	
Sequence of items E[3] or F[4]	ACE)	ACF)	ADE)	ADF)	BCE)	BCF)	BDE)	BDF)
n (xxE: n = 51; xxF: n = 47)	*11*	*11*	*12*	*11*	*14*	*13*	*14*	*12*

Notes: [1] first measurement under emotional induction and second in the neutral condition.
[2]first measurement in the neutral condition and second under emotional induction.
[3]original sequence of the questionnaire in the emotional condition and opposite sequence in the neutral condition.
[4]opposite sequence of the questionnaire in the emotional condition and original sequence in the neutral condition.

personality scores, we conducted a three step design. First a multivariate 5 × 2 × 2 level repeated measurement ANOVA was performed to test for the global null hypothesis. Two within-subject factors (personality factor and treatment condition) and one between-subject factor (induced emotion) were included. Regarding Hypothesis 1, only the triple interaction was expected to be significant. If Mauchly's Tests of Sphericity yielded significance, degrees of freedom were corrected according to Huyn-Feldt as Greenhouse-Geisser ε's were above 0.75. Eta-squared (η^2) was estimated to describe effect sizes, where $\eta^2 = 0.01$ describes a small, $\eta^2 = 0.06$ a medium and $\eta^2 = 0.14$ a large effect (Cohen 1988). In the second step we computed a 2 × 2 level repeated measurement ANOVA for each personality factor with treatment condition as within and induced emotion as between-subject factor, again we expected the interaction to be significant. In the third step, paired-sample t-tests were computed for every personality factor per induced emotion combination. Effect sizes and 95% confidence intervals for paired *t*-tests were calculated following Dunlap et al. (1996). Confidence interval of the effect sizes were calculated with PSY (www.psy.unsw.edu.au/research/research-tools/psy-statistical-program). Post-hoc power calculations showed a satisfying probability to detect reported effects (~73% for the largest reported effect size). In addition, percentages of participants with increasing vs. decreasing personality scores during treatment were displayed to estimate mean variability due to the respective mood induction. Finally, Pearson correlations were calculated between personality traits at baseline and emotional control items.

Randomization check

We controlled goodness of randomization by comparing the personality scores of the happiness and sadness group using t-tests for independent samples. The groups differed neither at baseline, nor after emotion induction ($ps > 0.1$). In order to exclude any possible sequence or habituation biases, we enlarged the 5 × 2 × 2 repeated measurement ANOVA by adding the two 2-level between-subject factors "order of condition" and "sequence of items", expecting neither main effects nor interactions under involvement for one or both factors. According to this, the computed model showed no significant main effect as well as no significant interaction on every possible combination of the five factors ($ps > 0.1$).

Results

Manipulation check

Directly after emotion induction, 85% of the happiness group members agreed at least somewhat (values ≥ 4 of the total range of 0–6) to the item: "Right now I feel very happy" ($M = 4.4$) and 80% of the sadness group members agreed at least somewhat to the item: "Right now I feel very sad" ($M = 4.1$), with no mean rank differences between the conditions $Z = -0.46$, exact $p = 0.65$. After having filled out the questionnaire, 52% of the sadness group ($M = 3.4$) and 55% of the happiness group ($M = 3.7$) still agreed to the same item. Again, no mean rank differences between the conditions were obtained $Z = -0.86$, exact $p = 0.39$.

Descriptives

Table 2 shows the averaged Big Five factor scores per personality factor, treatment condition and induced emotion. For a summary of statistical analysis see Figure 1.

Repeated measures ANOVAs

In a first step, the 3-factor-interaction between treatment condition (within), induced emotion (between) and personality traits (within), tested by a 5 × 2 × 2 level repeated measurement ANOVA revealed a highly significant result with $F(3.71, 356.02) = 6.10$, $p < .001$, $\eta^2 = 0.06$, but, as predicted, none of the 2-factor combinations were significant: 1) treatment condition * induced emotion: $F(1, 96) = 0.04$, $p = 0.85$, $\eta^2 < 0.01$, 2) induced emotion * personality factor: $F(3.19, 306.08) = 0.54$, $p = 0.67$, $\eta^2 < 0.01$, and 3) treatment condition * personality factor: $F(3.71, 356.02) = 2.34$, $p = 0.06$, $\eta^2 = 0.02$. In accordance to the hypothesis, there was also no significant main effect for treatment condition: $F(1, 96) = 0.98$, $p = 0.32$, $\eta^2 = 0.01$, and induced emotion: $F(1, 96) = 0.72$, $p = 0.40$, $\eta^2 < 0.01$.

Table 2 Descriptive statistics: mean and standard deviations of the personality scores per altered Big Five trait, depending on treatment condition and induced emotion

Trait	Treatment condition	Induced emotion			
		Sadness (n = 53)		Happiness (n= 45)	
Neuroticism	Neutral (SD)	31.51	(11.70)	32.51	(12.91)
	Emotion (SD)	35.29	(10.63)	31.98	(13.57)
	Difference (SD)	*3.78*	*(6.67)*	*−0.53*	*(6.52)*
Extraversion	Neutral (SD)	45.77	(9.97)	44.53	(9.61)
	Emotion (SD)	44.41	(10.44)	45.93	(9.06)
	Difference (SD)	*−1.36*	*(4.59)*	*1.40*	*(6.37)*
Openness	Neutral (SD)	49.79	(7.11)	52.24	(8.82)
	Emotion (SD)	49.28	(8.09)	51.96	(9.54)
	Difference (SD)	*−0.50*	*(5.27)*	*−0.29*	*(5.2)*
Agreeableness	Neutral (SD)	48.98	(6.85)	48.04	(10.02)
	Emotion (SD)	47.81	(7.86)	48.42	(8.26)
	Difference (SD)	*−1.17*	*(4.24)*	*0.38*	*(4.87)*
Conscientiousness	Neutral (SD)	45.28	(11.13)	47.11	(9.90)
	Emotion (SD)	46.02	(9.28)	47.17	(8.91)
	Difference (SD)	*0.74*	*(5.15)*	*0.05*	*(4.44)*

Note. SD = Standard Deviation.

This supported the hypothesis that emotional states generally and differentially alter self-rated personality dimensions compared to base-line measurements.

In a second step 2 × 2 level repeated measurement ANOVAs were computed for every Big Five factor. Significant interactions were shown for the factors neuroticism with $F(1, 96) = 10.39$, $p < 0.01$, $\eta^2 = 0.10$, and extraversion: $F(1, 96) = 6.19$, $p < 0.05$, $\eta^2 = 0.06$, as well as a trend-like interaction on agreeableness: $F(1, 96) = 2.83$, $p = 0.10$, $\eta^2 = 0.03$. The hypothesis, that a differential effect only occurs for personality dimensions with construct-related similarity to habitual emotions was supported but was only a trend for agreeableness.

Post-hoc paired t-tests

In a third step, the three previously identified factors were chosen for post-hoc analyses with paired-sample t-tests (see Table 3). The hypothesis that emotional valence in accordance to the reported relationships of habitual emotion to personality factors shows stronger effects was partially supported: Negative emotion did result in higher neuroticism scores and a lower score for agreeableness, while the

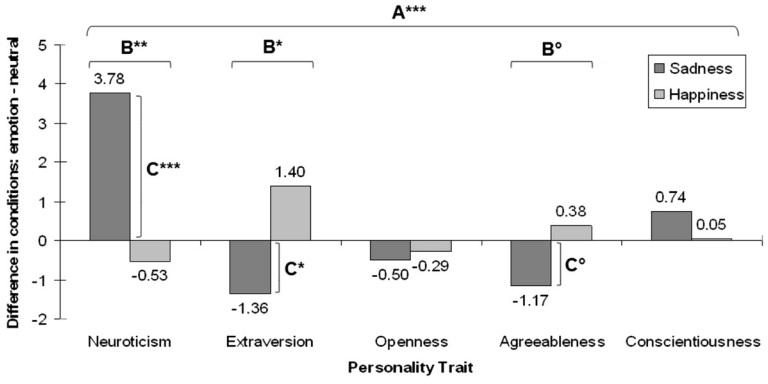

Figure 1 Mean differences of personality scores between emotional and neutral condition dependent on personality factor and induced emotion, results of 5 × 2 × 2 ANOVA, post-hoc 2 × 2-ANOVAs and paired-sample t-tests. Notes: *** = $p < .001$; ** = $p < .01$; * = $p < .05$; ° = $p < .10$ *A: triple interaction of 5×2×2-ANOVA with factors personality trait (Big Five) × emotional condition (neutral and emotional) × induced emotion (sadness and happiness). B: interaction of 2×2-ANOVA with factors emotional condition (neutral and emotional) × induced emotion (sadness and happiness). C: paired-sample t-tests between neutral and emotional condition.*

Table 3 Results of the post-hoc paired t-tests and percentages of changes between measurements

Big five factor	Induced emotion	Post hoc paired t-Tests						Differences[1]	
		df	*t*	*SE*	*p*	*d*	*d's 95% CI*	n > e	e > n
Neuroticism	Sadness	52	**4.12**	0.92	**< 0.01****	**0.34**	0.18-0.50	32%	**66%**
	Hapiness	44	−0.55	0.97	0.59		−0.19-0.11	47%	47%
Extraversion	Sadness	52	**−2.16**	0.63	**< 0.05***	**0.13**	0.01-0.26	**60%**	30%
	Hapiness	44	1.48	0.95	0.15		−0.06-0.36	33%	56%
Agreeableness	Sadness	52	**−2.01**	0.58	**0.05***	**0.14**	0.00-0.33	**60%**	36%
	Hapiness	44	0.52	0.73	0.61		−0.12-0.20	36%	51%

Note. Bold data indicate significant differences at α = .05; * = p < .05; ** = p < .01; df = degrees of freedom; t = t-Value; SE = standard error of the mean, p = p-Value, d = Cohens d; d's 95% CI = 95% confidence interval for the effect size d; n = neutral condition; e = emotion condition.
[1]Percentage of participants with increased vs. decreased personality scores during treatment.

positive emotion did not affect any of them. As a contradiction to the hypothesis, happiness did not significantly increase the extraversion score, although sadness did lower the score. The percentages of participants with a higher score for a respective personality factor in the neutral or emotion conditions (see last columns of Table 3) indicate that changes in self-reported personality scores were not due to outlier effects. Instead, each effect is based upon the majority of the participants.

Correlation analyses on emotional reactivity

Neither neuroticism nor extraversion at baseline was able to predict the immediate intensity of the respective emotional experience. In contrast, people scoring high on neuroticism tended to display a higher durability of the negative emotion, as revealed by the second manipulation check $r = .37$, $p < .01$, $N = 53$, while more extraverted people tended to maintain happiness $r = .30$, $p < .05$, $N = 45$.

Discussion

The purpose of this study was to investigate if emotional states have a systematic influence on personality measurement. We hypothesized that such influence differs depending on the construct similarity between the habitual emotion and personality dimensions – as well as the valence of the induced emotion. As results show, this assumption was predominantly right. It seems that the well-known relationships between habitual emotions and personality traits are reflected in the influence of emotional states on personality measurement. Differential effects of sadness and happiness could be shown on the dimensions neuroticism and extraversion and as a trend for agreeableness. These results are in accordance with Becker (2001) and Clark and Watson (1999), who both examined habitual emotions. The post-hoc analysis of our study attracts attention as it reveals that mainly sadness induction led to these differential results. When sadness was induced, scores of three personality dimensions differed from their baseline measures.

The influence of sadness on personality traits

When sadness was induced, neuroticism went up considerably and extraversion and agreeableness decreased moderately. Compared to baseline, neuroticism scores increased for nearly two-thirds (66%) of the participants. Further, the 95% confidence interval of the effect size did not include 0.125, indicating a substantial effect (cf. Yarkoni 2012) even though we verified the strong relationship between negative affect and neuroticism (Becker 2001; Clark and Watson 1999) as far as the within-person measurement level. A possible explanation for this finding is that negative affect may trigger negative experiences, which are linked as a component to elevated neuroticism scores (Ormel et al. 2012). The AIM model states that participants may have conferred their actual emotional state onto their general feelings as well as emotions may have automatically primed associated ideas or memories (Forgas 2008). Further, self-reported neuroticism could also have been influenced by the accommodative, externally focused reasoning strategy induced by negative affect (Forgas 2008).

Regarding the large body of research which relates neuroticism to mostly negative outcomes, it seems to be increasingly important to assess neuroticism in an unbiased manner (Cuijpers et al. 2010; Bowen et al. 2012; Ready et al. 2012). This measurement bias could be minimized by controlling for influencing emotional states (Viswesvaran and Ones 2000), which may lead to an even stronger predictive power for subsequent behaviour.

The nonexistent influence of happiness on personality traits

In the happiness condition, no influence on personality traits' measurement was detected - though an increase of extraversion scores could be descriptively observed. The first possible explanation is pragmatic: Unfortunately dropout participants had all been randomly assigned to the happiness group, resulting in a smaller number of participants. Alternatively, one could be tempted to argue that the happiness induction was not effective; however, this is not supported by the emotion control items. As the manipulation

check shows, the agreement to the emotion control item was high – and even slightly higher in the happiness group than in the sadness condition. This either indicates that participants could subjectively accept the happiness induction better, although it had a weaker impact on personality scores, or that most participants are happy anyway (Diener and Diener 1996). Thus, participants' personality scores at baseline may not significantly differ after induced happiness as they were happy without explicit induction.

A third explanation for the weaker effect of the happiness induction refers to Nesse (1990): "Emotional states not only motivate action, they are also goals that we seek to achieve. Most human thought, plans, and actions are intended to induce positive emotions or to avoid negative emotions." (Nesse 1990, p. 262). From this evolutionary point of view, a successful induction of sadness would be more relevant for participants' behaviour because sadness indicates a situation that should be changed, while positive emotions indicate situations that should be maintained (Nesse 1990). Change is more urgent than maintenance. Hence, we suggest that negative emotions may display stronger effects because they are largely stimulative and motivational.

Possible implications on theory

Using a correlative post-analysis of the emotion-control items, we tried to replicate emotional reactivity theory. In accordance with previous research (Hemenover 2003; Smillie et al. 2012), the neuroticism and extraversion baseline scores correlated with the change rate of the related emotion before and after filling out the questionnaire. While people scoring high on neuroticism tend to display a higher durability of the negative emotion, more extraverted people tend to maintain happiness.

Of course, the results of our study are only first hints. Still, they indicate that it could be reasonable to expand the well-known reactivity model of personality and emotional experience by a reciprocal element: personality determines the experience of emotions while emotional states vice versa impact personality self-ratings. The examination of how and under which conditions this reciprocity occurs and if it is moderated by baseline personality traits is subject to further research.

Limitations

We hypothesized that emotional states bias the measurement of personality traits, especially in experimental test situations. Emotional induction was unsuccessful in only one in five in the sadness group and one in seven members in the happiness group – at least on the conscious level. Although social desirability bias is possible, intimate knowledge of our hypotheses and the questionnaire would have been necessary to fake the Big Five self-ratings in any intended direction. Furthermore, this would not explain why significant effects only occurred after negative mood induction.

Conclusion

Inducing emotions and examining their influence on personality research seems to be a very fertile, powerful and promising approach. In the present study, induced sadness increased self-reported neuroticism while decreasing extraversion. Becoming aware of participants' emotional state and paying attention to the possible implications on testing could lead to a notable increase in the stability of assessed personality traits.

Competing interest

The authors declared that they had no competing interest with respect to their authorship or the publication of this article.

Authors' contributions

JQ contributed to the study design and carried out participant testing. JQ and SS performed statistical analysis and drafted the manuscript. JQ and SS revised the manuscript. Both authors read and approved the final manuscript.

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